Supplemental Mathematical Operators
Range: 2A00–2AFF

The Unicode Standard, Version 15.1
This file contains a excerpt from the character code tables and list of character names for
The Unicode Standard, Version 15.1

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See https://www.unicode.org/errata/ for an up-to-date list of errata.

See https://www.unicode.org/charts/ for access to a complete list of the latest character code charts.
See https://www.unicode.org/charts/PDF/Unicode-15.1/ for charts showing only the characters added in Unicode 15.1.
See https://www.unicode.org/Public/15.1.0/charts/ for a complete archived file of character code charts for Unicode 15.1.
See https://www.unicode.org/charts/About.html#Conventions for conventions used in these code charts, and other
general information.

Disclaimer
These charts are provided as the online reference to the character contents of the Unicode Standard, Version 15.1 but do
not provide all the information needed to fully support individual scripts using the Unicode Standard. For a complete
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Standard, Version 15.1, online at https://www.unicode.org/versions/Unicode15.1.0/, as well as Unicode Standard Annexes
#9, #11, #14, #15, #24, #29, #31, #34, #38, #41, #42, #44, #45, and #50, the other Unicode Technical Reports and Standards,
and the Unicode Character Database, which are available online.

See https://www.unicode.org/ucd/ and http://www.unicode.org/reports/

A thorough understanding of the information contained in these additional sources is required for a successful
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See https://www.unicode.org/pending/pending.html and http://www.unicode.org/alloc/Pipeline.html.
See https://www.unicode.org/charts/About.html for more information concerning the conventions and symbols used in
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### Supplemental Mathematical Operators

<table>
<thead>
<tr>
<th>Decimal</th>
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<th>Value</th>
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</tr>
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</table>

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N-ary operators

2A00  N-ARY CIRCLED DOT OPERATOR
→ 2299 · circled dot operator
→ 25C9 ⌁ fisheye
2A01  N-ARY CIRCLED PLUS OPERATOR
→ 2295 ⊕ circled plus
2A02  N-ARY CIRCLED TIMES OPERATOR
→ 2297 ⋅ circled times
→ 2B89 ▶ heavy circled saltire
2A03 ⨆ N-ARY UNION OPERATOR WITH DOT
→ 228D ⋈ n-ary union operator with dot
2A04 ⨇ N-ARY UNION OPERATOR WITH PLUS
→ 228E ⋉ n-ary union
2A05 ⨈ N-ARY SQUARE INTERSECTION OPERATOR
→ 2293 ⌌ square cap
2A06 ⨉ N-ARY SQUARE UNION OPERATOR
→ 2294 ▲ square cup
2A07 ⊎ TWO LOGICAL AND OPERATOR
= merge
→ 2A55 ⊓ two intersecting logical and
2A08 ⊏ TWO LOGICAL OR OPERATOR
→ 2A56 ⊔ two intersecting logical or
2A09 ⊦ N-ARY TIMES OPERATOR
→ 00D7 ⋇ multiplication sign

Summations and integrals

2A0A ∑ MODULO TWO SUM
→ 2211 Σ n-ary summation
2A0B ∭ SUMMATION WITH INTEGRAL
2A0C ⨊ QUADRUPLE INTEGRAL OPERATOR
→ 2220 ⨋ triple integral
≈ 222B ⨒ 222B ⨒ 222B ⨒ integral
2A0D ⨌ FINITE PART INTEGRAL
2A0E ⨍ INTEGRAL WITH DOUBLE STROKE
2A0F ⨎ INTEGRAL AVERAGE WITH SLASH
2A10 ⨏ CIRCULATION FUNCTION
2A11 ⨐ ANTICLOCKWISE INTEGRATION
2A12 ⨏ LINE INTEGRATION WITH RECTANGULAR PATH AROUND POLE
2A13 ⨑ LINE INTEGRATION WITH SEMICIRCULAR PATH AROUND POLE
2A14 ⨒ LINE INTEGRATION NOT INCLUDING THE POLE
2A15 ⨓ INTEGRAL AROUND A POINT OPERATOR
→ 222E ⋷ contour integral
2A16 ⨔ QUATERNION INTEGRAL OPERATOR
2A17 ⨕ INTEGRAL WITH LEFTWARDS ARROW WITH HOOK
2A18 ⨖ INTEGRAL WITH TIMES SIGN
2A19 ⨗ INTEGRAL WITH INTERSECTION
2A1A ⨘ INTEGRAL WITH UNION
2A1B ⊦ INTEGRAL WITH OVERBAR
= upper integral
2A1C ⊧ INTEGRAL WITH UNDERBAR
= lower integral

Miscellaneous large operators

2A1D ⊲ JOIN
= large bowtie
• relational database theory
→ 22C8 ⌂ bowtie
→ 27D7 ⌢ full outer join
2A1E ♦ LARGE LEFT TRIANGLE OPERATOR
• relational database theory
→ 25C1 ⌣ white left-pointing triangle
2A1F § Z NOTATION SCHEMA COMPOSITION
→ 2A3E † z notation relational composition
2A20 ⊱ Z NOTATION SCHEMA PIPING
→ 2227 Λ logical and
2A21 ⊲ Z NOTATION SCHEMA PROJECTION
→ 21BE † upwards harpoon with barb rightwards

Plus and minus sign operators

2A22 ‡ PLUS SIGN WITH SMALL CIRCLE ABOVE
2A23 ‡ PLUS SIGN WITH CIRCUMFLEX ACCENT ABOVE
2A24 ‡ PLUS SIGN WITH TILDE ABOVE
= positive difference or sum
2A25 ⊳ PLUS SIGN WITH DOT BELOW
→ 2214 ● dot plus
2A26 ⊲ PLUS SIGN WITH TILDE BELOW
= sum or positive difference
2A27 † PLUS SIGN WITH SUBSCRIPT TWO
= nim-addition
2A28 ⊮ PLUS SIGN WITH BLACK TRIANGLE
2A29 ⊯ MINUS SIGN WITH COMMA ABOVE
2A2A ⊰ MINUS SIGN WITH DOT BELOW
→ 2238 ● dot minus
2A2B ⊱ MINUS SIGN WITH FALLING DOTS
2A2C ⊲ MINUS SIGN WITH RISING DOTS
2A2D ⊳ PLUS SIGN IN LEFT HALF CIRCLE
2A2E ⊲ PLUS SIGN IN RIGHT HALF CIRCLE

Multiplication and division sign operators

2A2F ❧ VECTOR OR CROSS PRODUCT
→ 00D7 × multiplication sign
2A30 ❧ MULTIPLICATION SIGN WITH DOT ABOVE
2A31 ❧ MULTIPLICATION SIGN WITH UNDERBAR
2A32 ❧ SEMIDIRECT PRODUCT WITH BOTTOM CLOSED
2A33 ⋆ SMASH PRODUCT
2A34 ⋇ MULTIPLICATION SIGN IN LEFT HALF CIRCLE
2A35 ⋈ MULTIPLICATION SIGN IN RIGHT HALF CIRCLE
2A36 ⋉ CIRCLED MULTIPLICATION SIGN WITH CIRCUMFLEX ACCENT
2A37 ⋊ MULTIPLICATION SIGN IN DOUBLE CIRCLE
2A38 ⋋ CIRCLED DIVISION SIGN

Miscellaneous mathematical operators

2A39 △ PLUS SIGN IN TRIANGLE
2A3A ▽ MINUS SIGN IN TRIANGLE
2A3B ▼ MULTIPLICATION SIGN IN TRIANGLE
2A3C ⊻ INTERIOR PRODUCT
→ 230B ⌂ right floor
~ 2A3C FE00 J tall variant with narrow foot
2A3D ⌘ RIGHHAND INTERIOR PRODUCT
→ 230A ⌂ left floor
→ 2319 ⊲ turned not sign
~ 2A3D FE00 L tall variant with narrow foot
2A3E ‌ Z NOTATION RELATIONAL COMPOSITION
→ 2A1F § z notation schema composition
2A3F ⊌ AMALGAMATION OR COPRODUCT
→ 2210 ⌍ n-ary coproduct

Intersections and unions

2A40 ⋂ INTERSECTION WITH DOT
→ 2227 Λ logical and
2A41 ⋀ UNION WITH MINUS SIGN
= z notation bag subtraction
→ 228E ⋈ multiset union

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Supplemental Mathematical Operators

Logical ands and ors

2A50 ☐ CLOSED UNION WITH SERIFS AND SMASH PRODUCT
2A51 ☑ LOGICAL AND WITH DOT ABOVE
2A52 ☒ LOGICAL OR WITH DOT ABOVE
2A53 ☢ DOUBLE LOGICAL AND
2A54 ☣ DOUBLE LOGICAL OR
2A55 ☤ TWO INTERSECTING LOGICAL AND
2A56 ☥ TWO INTERSECTING LOGICAL OR
2A57 ☦ SLOPING LARGE AND
2A58 ☧ SLOPING LARGE OR
2A59 ☨ LOGICAL OR OVERLAPPING LOGICAL AND
2A5A ☩ LOGICAL AND WITH MIDDLE STEM
2A5B ☪ LOGICAL OR WITH MIDDLE STEM
2A5C ☫ LOGICAL AND WITH HORIZONTAL DASH
2A5D ☬ LOGICAL OR WITH HORIZONTAL DASH
2A5E ☭ LOGICAL AND WITH DOUBLE OVERBAR
2A5F ☮ LOGICAL AND WITH UNDERBAR
2A60 ☯ LOGICAL OR WITH DOUBLE UNDERBAR
2A61 ☰ SMALL VEE WITH UNDERBAR
2A62 ☱ LOGICAL OR WITH DOUBLE OVERBAR
2A63 ☲ LOGICAL OR WITH DOUBLE UNDERBAR

Miscellaneous mathematical operators

2A64 ☽ Z NOTATION DOMAIN ANTIRESTRICTION
2A65 ☾ Z NOTATION RANGE ANTIRESTRICTION

Relational operators

2A66 ≧ EQUALS SIGN WITH DOT BELOW
2A67 ≨ IDENTICAL WITH DOT ABOVE
2A68 ≩ TRIPLE HORIZONTAL BAR WITH DOUBLE VERTICAL STROKE
2A69 ≪ TRIPLE HORIZONTAL BAR WITH TRIPLE VERTICAL STROKE
2A6A ≫ TILDE OPERATOR WITH DOT ABOVE
2A6B ≫ TILDE OPERATOR WITH RISING DOTS
2A6C ≳ SIMILAR MINUS SIMILAR
2A6D ≫ CONGRUENT WITH DOT ABOVE
2A6E ≥ EQUALS WITH ASTERISK
2A6F ≶ ALMOST EQUAL TO WITH CIRCUMFLEX ACCENT
2A70 ≷ APPROXIMATELY EQUAL OR EQUAL TO
2A71 ≸ EQUALS SIGN ABOVE PLUS SIGN
2A72 ≹ PLUS SIGN ABOVE EQUALS SIGN
2A73 ≺ EQUALS SIGN ABOVE TILDE OPERATOR
2A74 ≺ DOUBLE COLON EQUAL
2A75 ≺ TWO CONSECUTIVE EQUALS SIGNS
2A76 ≺ THREE CONSECUTIVE EQUALS SIGNS
2A77 ≺ EQUALS SIGN WITH TWO DOTS ABOVE AND TWO DOTS BELOW
2A78 ≺ EQUIVALENT WITH FOUR DOTS ABOVE
2A79 ≺ LESS-WITH-CIRCLE INSIDE
2A7A ≺ GREATER-THERE-INSIDE
2A7B ≺ LESS-THERE-INSIDE
2A7C ≺ GREATER-THERE-INSIDE MARK
2A7D ≺ LESS-THERE OR SLANTED EQUAL TO
2A7E ≺ GREATER-THERE OR SLANTED EQUAL TO
2A7F ≺ GREATER-THERE OR SLANTED EQUAL TO WITH DOT INSIDE
2A80 ≺ LESS-THERE OR SLANTED EQUAL TO WITH DOT INSIDE
2A81 ≺ LESS-THERE OR SLANTED EQUAL TO WITH DOT ABOVE
2A82 ≺ GREATER-THERE OR SLANTED EQUAL TO WITH DOT ABOVE
2A83 ≺ LESS-THERE OR SLANTED EQUAL TO WITH DOT ABOVE RIGHT
2A84 ≺ GREATER-THERE OR SLANTED EQUAL TO WITH DOT ABOVE LEFT
2A85 ≺ LESS-THERE OR APPROXIMATE
2A86 ≺ GREATER-THERE OR APPROXIMATE
2A87 ≺ LESS-THERE AND SINGLE-LINE NOT EQUAL TO
2A88 ≺ GREATER-THERE AND SINGLE-LINE NOT EQUAL TO
2A89 ≺ LESS-THERE AND NOT APPROXIMATE
2A8A ≺ GREATER-THERE AND NOT APPROXIMATE
2A8B ≺ LESS-THERE ABOVE DOUBLE-LINE EQUAL ABOVE GREATER-THERE
2A8C ≺ GREATER-THERE ABOVE DOUBLE-LINE EQUAL ABOVE LESS-THERE
2A8D ≺ LESS-THERE ABOVE EQUAL OR LESS-THERE
2A8E ≺ GREATER-THERE ABOVE SIMILAR OR EQUAL
2A8F ≺ LESS-THERE ABOVE SIMILAR OR GREATER-THERE

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Supplemental Mathematical Operators

Subset and superset relations

Forks

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Supplemental Mathematical Operators

Miscellaneous mathematical operator

2AFF  ⫿  TRIPLE COLON OPERATOR
  • logic
  → 205D  :  tricolon
  → 22EE  :  vertical ellipsis

Relations

2AF7  ≪  TRIPLE NESTED LESS-THAN
  → 22D8  ≪  very much less-than
2AF8  ≫  TRIPLE NESTED GREATER-THAN
  → 22D9  ≫  very much greater-than
2AF9  ≼  DOUBLE-LINE SLANTED LESS-THAN OR EQUAL TO
  → 2266  ≼  less-than over equal to
2AFA  ≽  DOUBLE-LINE SLANTED GREATER-THAN OR EQUAL TO
  → 2267  ≽  greater-than over equal to
2AFB  //  TRIPLE SOLIDUS BINARY RELATION
  → 2AF4  //  triple vertical bar binary relation

Operators

2AFC  ///  LARGE TRIPLE VERTICAL BAR OPERATOR
  • often n-ary
  → 2AF4  ///  triple vertical bar binary relation
  → 2980  ///  triple vertical bar delimiter
2AFD  //  DOUBLE SOLIDUS OPERATOR
  → 2225  //  forces
2AED  =  N-ARY WHITE VERTICAL BAR
  = n-ary Dijkstra choice
2AFF  |  N-ARY WHITE VERTICAL BAR
  = n-ary Dijkstra choice

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<tr>
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<th>Standardized Variation Sequences</th>
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<td>RIGHTHAND INTERIOR PRODUCT</td>
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<td>( \text{with slanted equal} )</td>
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